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EXAMINER
PATEL, SHAMBHAVI K

ART UNIT	PAPER NUMBER
2128	

DATE MAILED: 11/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>23 December 2003</u>.

2a)☐ This action is **FINAL.** 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-20</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-20</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>23 December 2003</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All b)☐ Some * c)☐ None of:

        1.☒ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date <u>3/22/04</u>.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Claims 1-20 are pending.

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d).

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 22 March 2004 is in compliance with

the provisions of 37 CFR 1.97. Accordingly, the Examiner has considered the IDS as to the merits.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1.   **Claims 9-14 are rejected under 35 U.S.C. 112, second paragraph**, as being indefinite for

failing to particularly point out and distinctly claim the subject matter which applicant regards as the

invention. Regarding **claims 9 and 12,** the meaning of the final limitation 'generating a third program

based on the third program' is unclear. The Examiner interprets this to mean that the third program is

generated based on the third description. All other claims are rejected by virtue of their dependency.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2.   **Claims 1-20 are rejected under 35 U.S.C. 101** because the claimed invention is directed to non-

statutory subject matter. The Examiner asserts that the current state of the claim language is such that a

reasonable interpretation of the claims would not produce a useful, concrete or tangible result.

Regarding **claims 1 and 5**, executing a program to execute an additional process does not

produce a tangible result. Regarding **claims 9 and 12**, generating a first, second, and third program does

not produce a tangible result. Regarding **claims 15 and 18**, executing a continuous simulation does not

produce a tangible result. All other claims are rejected by virtue of their dependency.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis

for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public
use or on sale in this country, more than one year prior to the date of application for patent in the United
States.

3.   **Claims 1-20 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Otter**
                                                                                            8/22-27
('Hybrid Modeling in Modelica based on the Synchronous Data Flow Principle', 1999).
                                                                                            ^

Regarding claims 1 and 5:

Otter discloses a simulation method of simulating a behavior of a mechanism to be simulated

along a time axis on the basis of description data using a hybrid model, comprising:

    a.   parsing the description data to extract a description of continuous system equations **(page**

        151: equations 2.1a-2.1b), a description of switching of the continuous system equations

        upon state transition **(page 152: code in left hand column—'when' clause)**, and a

        description of an additional process other than any process relating to the continuous

system equations (page 151: equations 2.2a). The sampled data system includes a plant (modeled using *continuous system equations*) and a controller *(additional process)*. When the condition of the 'when' clause on page 152 becomes true *(switching activity)* an event is triggered, the integration is halted, and the equations within the when the when clause are active at this event instant.

b. generating a first program on the basis of the extracted description of the continuous system equations (page 152: code in left hand column—line 12)

c. generating a second program on the basis of the extracted description of the switching (page 152: code in left hand column—lines 16-19)

d. generating a third program on the basis of the extracted description of the additional process (page 152: code in left hand column—line 10)

e. converting, by executing the first program, data structures of the continuous system equations into other data structures that allow execution of a simulation (page 152: code in left hand column). The equations shown on page 151 of the prior art are converted to the data structures that allow execution of a simulation with the code shown on page 152.

f. switching, by executing the second program, the converted continuous system equations to activate appropriate one of the converted continuous system equations and deactivate another instead, in response to occurrence of a first event (page 152: last block of code in right hand column). This is the code used to represent the switching activity. A specific example of this is given on page 156 left hand column and figure 7.

g. executing the simulation (page 156 left hand column last paragraph) to output data that expresses the behavior of the mechanism, wherein the activated one of the continuous system equations is solved by numerical integration along the time axis

according to the converted data structure ('3 Relation Triggered Events'). The

simulation is done through Dymola by continuous integration.

h. executing the third program to execute the additional process in response to occurrence of

a second event (page 152 2nd paragraph). The simulation of the additional process is

performed in zero (simulated) time, meaning that time is abstracted from the

computations and communications.

Regarding claim 2 and 6:

Otter discloses the method according to claims 1 and 5, further comprising detecting an

occurrence of an event; and calling the third program if the detected event corresponds to the second

event (page 152 left hand column 1st paragraph). When an event is triggered and evaluated to *true*, the

when clause is entered, and the digital controller is simulated.

Regarding claim 3 and 7:

Otter discloses the method according to claims 1 and 5, further comprising: exchanging a control

signal with an external system through an input/output port (figure 1 variables u, y) in accordance with

the third program, the external system including a mechanism control software system that control the

mechanism (figure 1 controller).

Regarding claims 4 and 8:

Otter discloses the method according to claims 1 and 5, wherein the first event contains an

evaluation result of internal variables of the mechanism (page 152: code in left hand column—lines 16-

19 sample (0, Ts)). The code samples events at sample instants using Ts *(an internal variable).*

Regarding claims 9 and 12:

Otter discloses a method for analyzing a hybrid model which is used for a simulation of a behavior of a mechanism to be simulated along a time axis, the method comprising:

a. parsing the hybrid model description to extract a first description associated with continuous system equations (**page 151: equations 2.1a-2.1b**), a second description associated with state transition (**page 152: code in left hand column—'when' clause**), and a third description associated with an additional process (**page 151: equations 2.2a**). The sampled data system includes a plant (modeled using *continuous system equations)* and a controller *(additional process)*. When the condition of the 'when' clause on page 152 becomes true *(switching activity)* an event is triggered, the integration is halted, and the equations within the when the when clause are active at this event instant.

b. generating a first program based on the first description (**page 152: code in left hand column—line 12**), a second program based on the second description (**page 152: code in left hand column—lines 16-19**), and a third program based on the third description (**page 152: code in left hand column—line 10**).

Regarding claims 10 and 13:

Otter discloses the method according to claims 9 and 12, wherein the third description comprises a first part which describes content of an additional process (**page 152: code in left hand column lines 17-18**), and a second part which describes an execution control of the additional process in response to occurrence of an event (**page 152: code in left hand column line 16**).

Regarding claims 11 and 14:

Otter discloses the method according to claims 10 and 13, wherein the generating further comprises: generating the third program on the basis of the first part of the third description (**page 152: code in left hand column—line 10**); and adding a program based on the second part to the second program (**page 152: code in left hand column lines 16-18**).

Regarding claims 15 and 18:

Otter discloses a simulation method for simulating a behavior of a mechanism along with a time axis, using a hybrid model including a continuous system model expressed by continuous system equations (**page 151: equations 2.1a-2.1b**), a state transition model expressing state transition upon occurrence of described events (**page 152: code in left hand column—'when' clause**), and an additional process model (**page 151: equations 2.2a**), the method comprising:

a. storing the continuous system model in a storage (**figure 1**)

b. checking whether any one of the events described in the state transition model is occurred and checking whether the occurred event is associated with the additional process model (**page 152 left hand column 1ˢᵗ paragraph**). The operator *sample(...)* triggers events at sample instants and depending on whether it returns true or false *(associated with additional process or not)*, the when is clause is entered.

c. executing an additional process corresponding to the additional process model if the occurred event is associated with the additional process model (**page 152 code in left hand column lines 17-18**)

d. executing a continuous simulation on the basis of continuous system equations that are active among the continuous system model stored in the storage (**'3. Relation Triggered Events'**). The continuous system equations are simulated through continuous integration.

Regarding claims 16 and 19:

Otter discloses the method according to claims 15 and 18, wherein the executing the additional process comprises exchanging a control signal with an external system through an input/output port (**figure 1 variables u, y**), the external system including a mechanism control software system that control the mechanism (**figure 1 controller**).

Regarding claims 17 and 20:

Otter discloses the method according to claims 15 and 18, further comprising switching, in response to state transition based on the state transition model, the continuous system equations that are active (**page 152 left hand column 1st paragraph**).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shambhavi Patel whose telephone number is (571) 272-5877. The examiner can normally be reached on Monday-Friday, 8:00 am – 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571) 272-2279. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SKP

KAMINI SHAH
SUPERVISORY PATENT EXAMINER